

REMARKS

Applicant has carefully considered the points raised in the Office Action and believes that the Examiner's concerns have been addressed as described herein, thereby placing this case into condition for allowance.

Status of the claims

Claims 1-10, 13, 16-21, 23, and 25-147 are pending. Claims 48-146 were previously withdrawn from consideration as drawn to non-elected inventions. By virtue of this response, claims 1 and 10 have been amended. Claims 1-10, 13, 16-21, 23, 25-47 and 147 are currently under consideration.

Support for the amendment to claim 1 may be found in the specification, for example, in the figures (*see, e.g.*, Fig. 5). Claim 10 has been amended to correct a clerical error by deleting a repeated word.

With respect to claim amendments, Applicant has not dedicated to the public or abandoned any unclaimed subject matter and moreover has not acquiesced to any rejections and/or objections made by the Patent Office. Applicant expressly reserves the right to pursue prosecution of any presently excluded subject matter or claim embodiments in one or more future continuation and/or divisional application(s).

Telephone interview

Applicant wishes to thank Examiner Leung for extending the courtesy of a telephone interview to Applicant's representative on March 23, 2006, and for the helpful discussion that ensued regarding the cited references and the language of the pending claims.

Claim objection

Claim 10 is objected to because the word “distance” is recited twice in the claim. By virtue of this amendment, this clerical error has been corrected, rendering the objection moot. Applicants respectfully request withdrawal of the objection to claim 10.

Rejection under 35 U.S.C. §112, second paragraph

Claims 1-10, 13, 16-21, 23, 25-47 and 147 are rejected under 35 U.S.C. §112, second paragraph as allegedly indefinite. Applicants respectfully traverse this rejection.

The Examiner states that the terms “significant” and “high,” as recited in claim 1, render the claims vague and indefinite because these are relative terms. Applicants respectfully disagree. It is well established law that use of relative terms in a patent claim does not in and of itself render a claim indefinite. For example, in *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116 (Fed. Cir. 2002), the Federal Circuit held that the term “expressions such as ‘substantially’ are used in patent documents when warranted by the nature of the invention, in order to accommodate the minor variations that may be appropriate to secure the invention. Such usage may well satisfy the charge to ‘particularly point out and distinctly claim’ the invention, 35 U.S.C. § 112, and indeed may be necessary in order to provide the inventor with the benefit of his invention,” so long as the scope of the subject matter described by the relative term “would be understood by persons in the field of the invention.” As set forth in MPEP §2173.05(b), “[t]he fact that claim language, including terms of degree, may not be precise, does not automatically render the claim indefinite under 35 U.S.C. 112, second paragraph. *Seattle Box Co. v. Industrial Crating & Packing, Inc.*, 731 F.2d 818 (Fed. Cir. 1984). Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification.” In the instant case, a skilled artisan would understand what is meant by the terms “high axial load” and “significant deformation.” However, solely in order to expedite prosecution and without acquiescence to the rejection, these terms have been deleted from the claims, rendering this rejection moot.

The Examiner further states that limitations with regard to contact between struts and the catalyst structure lack antecedent basis because the term “catalyst structure” is recited in the preamble of the claim and thus is not considered an element of the apparatus. Applicants respectfully disagree. As discussed in the telephone interview with Examiner Leung, it is a well established principle of patent law that both the preamble and the body of a claim may be used to define the subject matter of a claimed invention. “Terms appearing in a preamble may be deemed limitations of a claim when they give meaning to the claim and properly define the invention . . . [R]eview of a patent in its entirety should be made to determine whether the inventors intended such language to represent an additional structural limitation or mere introductory language.” *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994). In the present case, a review of the application in its entirety reveals that the claimed support structures are designed to support a catalyst structure in a catalytic reactor, and thus recitation of these terms in the preamble serves as a structural limitation, rather than simply as introductory language. When a term in the body of the claim refers back to a prior recitation of the term in the preamble, the preamble term is incorporated by reference and provides antecedent basis. In *Bell Communications Research, Inc., v. Vitalink Communications Corp.*, 55 F.3d 615 (Fed. Cir. 1995), the Federal Circuit considered the construction of a claim that recited “a method for transmitting a packet over a system comprising a plurality of networks . . . said packet including a source address and destination address” in the preamble, and then went on to recite, as steps of the method, “assigning, by said source device, one of said trees to broadcast *said* packet and associating with *said* packet an identifier indicative of said one of said trees.” The court held that “these two steps of the claimed method, by referring to ‘*said* packet,’ expressly incorporate by reference the preamble phrase “said packet including a source address and a destination address.” *Id.* The term “packet” in the preamble was construed as a limiting term, by virtue of reference back to the term in the body of the claim, and thus provided antecedent basis for the usage of this term in the steps of the claimed method. Similarly, in the present case, recitation of “*a* catalyst structure” in the preamble is incorporated by reference to provide antecedent basis for “*the* catalyst structure” in the phrase “the struts are configured to provide substantially uniform support with respect to a substantial portion of the catalyst structure” in the body of the claim.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §112, second paragraph.

Rejections under 35 U.S.C. §102(b)

Claims 1-5, 7, 9, 10, 16-19, 29 and 149 are rejected under 35 U.S.C. §102(b) as allegedly anticipated by Mullov et al. (RU 2 023 465). Applicant respectfully traverses this rejection.

The structure taught by Mullov et al. is a disc for turbulent mixing in a pulsating extrusion column, with the design providing increased rigidity as the disc diameter is increased. In contrast, the present claims are directed to a support structure that is capable of providing axial support for a catalyst structure in a catalytic reactor. Mullov et al. do not teach use of the disclosed discs for supporting a catalyst structure. Mullov et al. also do not teach a structure in which struts are configured to provide substantially uniform support with respect to a substantial portion of a catalyst structure as claimed. Mullov et al. also do not teach a structure in which struts are configured to minimally obstruct flow of a gas reaction mixture, or in which the struts are free to thermally expand and contract as the temperature changes. Therefore, Mullov et al. do not teach all of the elements of claim 1, and this reference does not anticipate claim 1 or any of the other rejected claims, which depend on claim 1. Further arguments are provided with respect to some of the rejected dependent claims below.

With regard to claim 2, the distance between alternate consecutive secondary struts in the structure depicted in the Mullov et al. reference are not substantially constant, as the Examiner contends. In Mullov et al.'s radial disc configuration, the distance between alternate consecutive secondary struts increases as the distance from the center of the disc increases.

With regard to claim 3, the claim recites that at least one strut of one branched segment is parallel to at least one strut of another branched segment, referring back to "at least two branched segments radially arranged about the center of the support structure" in claim 1, upon which claim 3 depends. The branched segments referred to in claim 3 are *within the same support structure*. In contrast, the Office Action refers to branched segments within *separate disc structures* in Mullov et

al. for the assertion that Mullov et al. teach struts within branched segments that are parallel to one another. Mullov et al. do not teach a single support structure comprising parallel struts as claimed.

With regard to claim 5, struts 4 and 3 are not parallel to each other as asserted by the Examiner. As discussed above, in the radial disc configuration disclosed by Mullov et al., the distance between struts increases as the distance from the center of the disc increases.

With regard to claim 9, each consecutive strut in the disc structure depicted by Mullov et al. is not connected at a variable distance from the proximal end of the previous strut to which the consecutive strut is connected. For example, the struts labeled “3” are connected at the same distance from the proximal ends of struts labeled “4.” Therefore, each consecutive secondary strut is not connected to the previous strut at a variable distance from the proximal end of the previous strut, as recited in claim 9.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b) over Mullov et al.

Claims 1, 2, 4, 5, 7, 10, 16, 17, 25-27, 29-34 and 42-45 are rejected under 35 U.S.C. §102(b) as allegedly anticipated by Grove et al. (U.S. Patent No. 3,073,685). Applicant respectfully traverses this rejection.

The support structure taught by Grove et al. does not contain branched segments as claimed in the present application. The support structures disclosed in this reference contain struts that radiate from the center of the apparatus or from a point along a concentric circle at an intermediate point between the center and the periphery of the device. The present claims, as amended, recite branched segments comprising a secondary strut that contacts the primary strut *at a position between the proximal and distal ends of the primary strut*. The “secondary struts” in Grove et al. (labeled “B” in the Examiner’s depiction on page 7 of the Office Action) contact the “primary struts” (labeled “A” in the Examiner’s depiction) at the distal ends of the struts “A,” not at a position between the proximal and distal ends of the primary strut as claimed. Likewise, the “additional secondary struts” (labeled “C” in the Examiner’s depiction) contact struts “B” at the

distal ends of struts “B” rather than at a position between the proximal and distal ends of the previous secondary strut as claimed. Therefore, Grove et al. do not teach all of the elements of claim 1, and this reference does not anticipate claim 1 or any of the other rejected claims, which depend on claim 1.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b) over Grove et al.

Claims 1-6, 8, 9, 13, 16, 20, 21, 23 and 29 are rejected under 35 U.S.C. §102(b) as allegedly anticipated by Brunner et al. (U.S. Patent No. 5,725,810). Applicant respectfully traverses this rejection.

Brunner et al. teach a packing for a counterflow high pressure column containing a bundle of strings extending in the direction of the column axis, with each string consisting of a stack of packing elements. The figure from Brunner et al. referred to by the examiner in the Office Action is a cross-section of a packed column, not a support structure as claimed. The high pressure columns taught by Brunner et al. do not contain struts, much less struts arranged in branched segments as presently claimed. The dictionary definition for “strut” is “a structural piece designed to resist pressure in the direction of its length.” Merriam-Webster Dictionary, 2006. The lamella depicted in the figure referred to by the Examiner in the Office Action direct fluid flow through a column along the direction of their length, or column axis. They do not resist pressure in the direction of their length and are therefore not struts within the plain meaning of this term. Further, Brunner et al. do not teach a support structure for supporting a catalyst structure in a catalytic reactor, a support structure in which a plurality of struts is configured to minimally obstruct flow of a gas reaction mixture, a support structure in which the struts are configured such that they are free to thermally expand and contract as the temperature changes, or a support structure in which struts are configured to provide substantially uniform support with respect to a substantial portion of a catalyst structure. Brunner et al. do not teach all of the elements of the claimed invention and do not anticipate the rejected claims.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b) over Brunner et al.

Claim Rejections Under 35 U.S.C. §103(a)

Claims 25-28, 39 and 40 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Mullov et al. (RU 2 023 465). Applicants respectfully traverse this rejection.

As discussed above, Mullov et al. teach a disc for turbulent mixing in an extrusion column rather than a support for a catalyst structure in a catalytic reactor as claimed. Mullov et al. also do not teach a structure in which struts are configured to provide substantially uniform support with respect to a substantial portion of a catalyst structure. Since this reference does not disclose these limitations recited in claim 1, upon which the rejected claims depend, the requirement for a *prima facie* case for obviousness that a prior art reference must teach or suggest all of the claim limitations is not satisfied. MPEP §2143. Further, the cited reference does not provide motivation to modify the structure for turbulent mixing taught by Mullov et al. to provide a structure for supporting a catalyst in a catalytic reactor as claimed. Motivation to modify a cited reference is also required to establish a *prima facie* case for obviousness. *Id.*

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §103(a) over Mullov et al.

Claims 35-38, 46 and 47 are rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Grove et al. (US 3,073,685). Applicant respectfully traverses this rejection.

As discussed above, Grove et al. do not teach a support structure comprising branched segments as claimed with secondary struts contacting primary struts or previous secondary struts toward the center at a position between the proximal and distal ends of the primary or previous secondary strut, as claimed. Since this reference does not disclose these limitations recited in claim 1, upon which the rejected claims depend, the reference does not teach or suggest all of the limitations of the rejected claims, as required for a *prima facie* case of obviousness. MPEP §2143. Further, Grove et al. do not provide motivation to modify the disclosed structure to provide a

support structure with the features of branched segments as claimed, as also required for a *prima facie* case for obviousness. *Id.* In addition, the limitations of claims 35-38, 46, and 47 involving a T-end at the distal end of a strut, a slot in an outer ring to receive the T-end, a strut with a distal end including a slot, or an outer ring passing through a slot at the distal end of a strut, are not obvious in view of Grove et al. These embodiments serve the function of allowing for thermal expansion as well as retention of the struts within the support structure. In contrast, the structure taught by Grove et al. contains “rings” that are supported by the reactor floor and rods that rest on the rings. The rods are not retained, so there is no need for a configuration that allows for retention under conditions of thermal expansion. Such features are therefore not obvious in view of the disclosure of Grove et al.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §103(a) over Grove et al.

CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark Office determines that an extension and/or other relief is required, Applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 220772008900. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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